Cleveland Clinic Innovations

PRODUCT
Identifies a focal area of abnormal network interactions in the brain.

INDICATION
Epilepsy, seizures, neurological disorders, neuro-recording, neuro-monitoring

VALUE PROPOSITION
- Identifies abnormal network interactions in the brain.
- Diagnoses neurological disorders based on affected focal areas.
- Facilitates more accurate treatment.

DEVELOPMENT STAGE
Prototype Developed

PUBLICATION
Epilepsia. 2018 May; 59(5): 982–992. doi:10.1111/epi.14064.

INTELLECTUAL PROPERTY
US 9,730,628

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System and Method for Identifying Abnormal Interactions in the Brain

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UNMET NEED

Despite many decades of research and the development of new antiepileptic drugs, a large number (30-40%) of epilepsy patients suffer from inadequately controlled seizures or undesirable side effects from their medication. Neuro-recording methods can be used to help identify epileptogenic focus, but since seizures typically occur unpredictably and without warning, these studies are often negative or inconclusive. A more effective form of examining network interactions in the brain following symptoms of a neurological disorder is needed.

SOLUTION

This invention consists of a system and method that identifies a focal area of abnormal brain interactions from time series data recorded during a resting period. By using neuro-recording modalities such as electroencephalogram (EEG), magnetoencephalogram (MEG), thermal imaging, and functional magnetic resonance imaging (fMRI), time series data corresponding to the bio-signals can be gathered. The device includes a non-transitory memory system that receives the time series data from multiple regions of the brain and compares the information inflow from each region to diagnose a neurological disorder. Testing of the device has shown that focal areas identified by the system have been consistent with the clinically assessed focal region. By understanding which focal area of the brain is affected, the type of neurological disorder can be more accurately diagnosed and facilitate a more adequate method of treatment.